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Note on the Possible Occurrence of an Ecological race of *Sclerospora Graminicola* (Sacc.) Schroet., from Coimbatore, India.

Sclerospora graminicola (Sacc.) Schroet, incident of downy mildew disease of pearl millet *(Pennisetum americaunm* (L.) formerly (*Pennisetum typhoides* (Burm.) stapf and Hubb., is one of the major limiting factors for optimum yields particularly with new hybrids.

Several workers have indicated the possibility of occurrence of strains of the pathogen,Uppal and Desai (1932).Tasugi (1934), Bhat (1973) and Girard, (1974). However there does not seem to be any authantic record on the occurrence of strains or races of *S. graminicola*.

In the present studies an attempt has been made to study the morphology and germination of sporangia and oospores, and pathogenecity of oospores collected from Delhi, Jamnagar, Kanpur and Coimbatore. These places represented different agroclimatic regions of the country.

Living as well as dried, brittled, infected leaves of pearl millet were collected from these places during "Kharif" 1977. These leaf materials provided, sporangia, sporangiophores and oospores of the pathogen from these places for the present studies. From each sample the measurements of 100, sporangia, sporangiophores and oospores were recorded. The germiniation of sporangia was studied by the method described Hirata and Takenouti (1932); and that of oospores by the method described by Sundaram and and Gurha (1977).

In order to study the pathogenecity ot the oosporic inoculum obtained from these places, the oosporic inoculum @ 1 g/1000 g of sterilized (autoclaved) soil was mixed, and filled in plastic pots of 15 cm size. For each oosporic inoculum sample, 3 replications and a suitable control with sterilized (autoclaved) soil only were maintained. Seeds of pearl millet cultivars, H.B-3, H.B-4, H.B.-5 23 D$_a$AxJ 275 and J-104 were sown in these pots after surface sterilization. In each pot 5 seeds were sown on 20-8-77 The number of infected plants in each treatment were recorded after 30 days of sowing and the percentage of infected plants was worked/out.

The result obtained from the presented in table 1 and 2.

The perusal of data in table 1 reveals though the mean diameter of the oospores, from these places, did not vary significantly, however there were smallest oospores from Coimbatore and the largest from Jamnagar. The oospores from Delhi and Kanpur were almost with the same average diameter.

The sporangiophores from Coimbatore were much longer and thinner as compared to those obtained from Delhi, Jamnagar and Kanpur. Though the sporangia from Delhi and Coimbatore were more or less spherical, but these were smallest from Coimbatore

collection. The sporangia from Jamnagar and Kanpur were larger and ovate.

In germination studies it was observed that sporangia from all the places germination within 30-45 minutes when these were suspended in distilled water and incubated at 22°C. The number of zoospores per sporangium generally varied from 3-10. In case of oospores maximum germination was observed from Coimbatore collection, (fig 1.), while in others very scanty germination was observed.

In pathogenecity test with oosporic inoculum, maximum infection was obtained in all the cultivars, with the inoculum collected from Coimbatore. The inoculum from Jamnagar, Kanpur and Delhi, gave maximum infection with HB-3, to the tune of 23.4, 30.8 and 32.6 per-cent respectively. J-104 a fairly resistant variety obtained 12.9 per-cent infection with the inoculum from Coimbatore, while with the inoculum from Jamnagar, Kanpur and Delhi it exhibited its resistance against the disease. The reason for the highest percentage of infected plants obtained with the inoculum from Coimbatore is surmized to be due to high virulence of the inoculum as compared to that from other places and the capacity of the oospores from Coimbatore to germinate frequently which was not observed with the oospores from other places. The present finbings differ with those of Suryanarayana (1965), who reported that oospores collected from Coimbatore failed to produce the disease. But these findings support the view of Bhat (1973), who reported that 'newly, formed oospores gave upto 55 per-cent infection. With 'newly' formed oospores he probably meant the oospores freshly produced and have not undergone the process of weathering. In the present findings too, infection upto 59.6% could be obtained with freshly formed oospores from Coimbatore.

The present findings leads to a conclusion, as to possible occurrence of an ecological race of the pathogen at Coimbatore.

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REFERENCES

BHAT, S. S. 1973. Investigations on the control of *Sclerospora graminicola* on bajara. Ph. D, Thesis. Dep. Post-Graduate Studies and Research in Botany, Mysore, University Mysore, India 165 pp.

GIRARD, J. C. 1974. Three years of study on millet and sorghum diseases at C, N. R. A. of Bombey Senegal (1972-74) 1-5 (mimeographed report)

HIRATA, E., and H. TAKENOUTI. 1932. Studies on the morphological and Physiological characters of *Sclerospora graminicola* on *Setaria italica* *Ann: Agric. Exp. Sta. Chosan* 6: 151-200.

SUNDARAM, N. V. and S. N. GURHA. 1972. Note on a rapid method for germination of oospores of *Sclerospora graminicola* (Sacc.) Schoret,.

the causal agent of pearlmillet downy mildew. *Indian J. Agric. Sci.* 47 (3) : 165-9.

SURYANARAYANA, D. 1965. Studies on the downy mildew diseases of millets in India. *Indian Phytopath. Soc. : Bull.* 3 : 72-78.

TASUGI, H. 1934. On life history pathogenicity and physiologic form of *S. graminicola* (Sacc.) Schroet. Studies on Nipponese Peronosporales *III J. Imp. Agric. Sta Nishigahara*, Tokyo. 3 : 345-66.

UPPAL, B. N. and M. K. DESAI, (1932). Physiologic specialization in Sclerospora graminicola (Sacc.) Schroe *Indian J. Agric Sci.* 2 : 667.

TABLE 1: Showing Measurements of Sporangia, Sporangiophores and Oospores in Microns.

Locations	Sporangia		Sporangiophores		Oospore Diameter		
	Average length	Average width	Average length	Average width	Maximum	Minimum	Mean
Jamnagar	17.5	13.7	135.9	18.7	57.3	37.2	42.6
Delhi	18.6	17.9	140.9	18.2	47.1	36.1	41.6
Coimbatore	14.8	13.0	286.5	16.7	48.3	34.1	41.0
Kanpur	16.3	12 5	161.9	17.1	47.9	33.6	41.4

TABLE 2: Showing Reactions of Pearlmillet Cultivars Against Oosporic Inoculum of *S. Graminicola*, From different Places

Cultivars	Percentage of infected Plants				Control (Sterilized Soil Only
	Coimbatore	Jamnagar	Kanpur	Delhi	
H. B-3	59.6	23.4	30.8	32.6	0
H. B-4	43.7	15.0	19.2	24.7	0
H. B-5	54.5	9.6	16.8	25.1	0
23 D_2AXJ 275	58.2	20.0	10.7	15.0	0
J-104	12.9	0	0	0	0